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BUBBLY CREEK FILTER PLANT ADOPTS LIQUID CHLORINE TREATMENT[1]

By C. A. Jennings

It is interesting to note that seven years ago water purification was accomplished by storage or sedimentation alone or in conjunction with filtration. There were no supplementary purifying processes, such as disinfection, that were on a practical working basis. Today the water works engineer has the choice of two or three supplementary processes, viz., hypochlorite, liquid chlorine and possibly ultra-violet rays. The first two are well established. The third, although it is possibly more practical than ozone at this time and although it has been given serious consideration recently by two or three cities, nevertheless is not yet on an established working basis.

The Bubbly Creek filter plant at the Chicago stock yards set the lead in the use of hypochlorite of lime in this country for water disinfection. This was during the summer of 1908. Several years ago experiments were begun at this plant with an electrolytic cell for the production of chlorine from salt brine. These experiments were carried out very extensively and thoroughly. The writer finally concluded that in comparison with hypochlorite and liquid chlorine, the production of chlorine for water disinfection by means of an electrolytic cell was expensive, uncertain and demanded considerable attention.

Very recently a liquid chlorine apparatus was purchased. Chlorine is received in cylinders that hold 105 pounds of the liquefied gas. From the experience gained by operating this apparatus during the past month, the writer has concluded that, in comparison with the use of hypo at the Bubbly Creek filter plant,

1. There is considerably less labor involved.
2. The absorption of the gas by the water is more rapid.
3. There is no loss of chlorine and smaller quantities can be used to accomplish equivalent results.

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[1] Read at first annual meeting Illinois Section, American Water Works Association, March 10, 1915.

4. There is no deterioration of the chlorine in the cylinders while using or while stored.

5. The changing of the rate of application is easily, quickly and accurately accomplished.

6. There is no odor of chlorine about the plant.

7. The cost is considerably less.

There are mechanical features about the Bubbly Creek filter plant which the writer believes are peculiar to it. These features are the enormous amount of hypochlorite necessary to disinfect the water, the poor mechanical means for getting into solution all of the hypochlorite used, which resulted in a large loss of available chlorine, and the last pertinent feature, the irregularity in the operation of the plant due to a varying consumption and small filtered water storage capacity. This often caused it to be necessary to run one or two filters for a time and then suddenly have to use eight filters. Naturally the coagulant and germicide must be proportioned to the amount of water being filtered. Now while using liquid chlorine, the regulation of the germicide is much more simple, accurate and economical than with hypo. The ratio of costs, during one month's operation with liquid chlorine with an average raw water supply and the treated filtered water as low in bacteria as when using hypo, was 1 to 3 in favor of liquid chlorine. It is hardly probable that every plant will show such a large difference in the costs of disinfection by the two methods.

DISCUSSION

Mr. H. E. Jordan: While the average plant using chlorine in some form as a sterilizing agent will not effect the saving noted by Mr. Jennings, the cost in any case will not effect the material advantages gained in ease of operation and freedom from odor.

Water works men have become accustomed to installing hypochlorite outfits in a very crude way, at a low cost. These installations need to be frequently replaced. So in considering the installation of a liquid chlorine plant, many will object to the comparatively large initial outlay. The liquid chlorine plant can be installed in an open pump room or even a plant office, without bad effect upon copper alloy or offense to the persons working there. The improvement in the mental attitude of the employees is a very great item in favor of this method. At the same time, liquid chlorine plants, while nominally automatic, need attention not only when changing tanks, but under normal conditions the responsiveness of the feed regulation device should be frequently tested. This is no more than is the case in running pumps or any other piece of water works machinery, and is not to be held as a disadvantage of a liquid chlorine plant.

The experience at the East Chicago plant, over a period of a year, is that the system is doing all that could be expected of it in its effect upon the water, and that it operates satisfactorily under conditions that are well nigh impossible of handling with a hypochlorite plant.

C. A. Jennings: In order to aid somewhat in analyzing the deductions made as to cost data, it might be added that the liquid chlorine costs us 8 cents per pound f.o.b. Niagara Falls and the freight rate is sufficient to bring the cost to 8½ cents per pound delivered in Chicago. The last carload lot of hypo purchased cost 1¾ cents per pound f.o.b. Chicago. The rate of application of hypo has been from 50 pounds to as high as 100 pounds per million gallons. Remarkable as it may seem, the saving in the cost of treatment by liquid chlorine over hypo is sufficient at the present rate to pay for the liquid chlorine apparatus in 100 days.